

PATENT ABSTRACTS OF JAPAN

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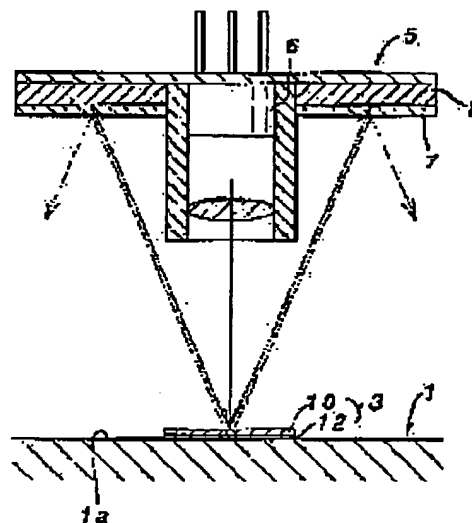
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(54) DISCRIMINATION STRUCTURE OF OBJECT

(57)Abstract:

PURPOSE: To eliminate an influence on the design of an object and to improve the degree of freedom of the design by providing a polarizing filter on the photodetection surface of a photodetecting means transmitting only linear polarized light which is not rotated.

CONSTITUTION: Light, which is transmitted through a light reflecting layer 10, of laser light which is made incident on a discrimination seal 3 passes through a polarization plane rotating layer 12 and is reflected by the surface 1a of a card 1 and passes through the polarization plane rotating surface 12 again, so that its plane of polarization is rotated by 90°. In the case where the card 1 is actually discriminated, the card 1 is conveyed and when the discrimination seal 3 is confronted with the light emitting element 6 of a light projection and photodetection unit 5, the light emitting element 6 irradiates the discrimination seal 3 with illumination light of 780nm consisting of linear polarized light in a specific direction. Then, the light which is diffracted and reflected by the discrimination seal 3 is transmitted through a polarizing filter 7 and photodetected by any of respective parts of the light receiving element 8 to discriminate whether the card 1 is a regular card or not according to the photodetection intensity.



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CLAIMS

[Claim(s)]

[Claim 1] Prepare the discernment section which has optical epicritic [of a proper] in an object, and detection light is irradiated with a floodlighting means towards said discernment section. It is the discernment structure of an object of receiving the outgoing radiation light with a light-receiving means, and discriminating said object being an object of normal from the light-receiving condition of said light-receiving means. Said floodlighting means consists of a means to floodlight the linearly polarized wave light which is specific wavelength and has plane of polarization in the specific direction. The light reflex layer in which said discernment section reflects the light of said wavelength with the diffraction property of an identifiable proper with an optical discernment means while consisting of an ingredient which penetrates the light and reflects that of specific wavelength other than the light, Discernment structure of the object characterized by having the plane-of-polarization rotation layer which consists of an optically anisotropic body made to rotate 90 degrees of linearly polarized wave light of said specific wavelength by the birefringence, and having the filter with which said light-receiving means penetrates only said linearly polarized wave light which is not rotating to the light-receiving side.

[Claim 2] Discernment structure of the object according to claim 1 characterized by said light reflex layer consisting of either a hologram or the diffraction gratings.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the discernment structure for identifying that an object is an object of normal.

[0002]

[Description of the Prior Art] In order to discriminate whether an information storage card, various negotiable securities, a ticket, or the goods that are generally sold, such as a magnetic card, etc. are the things of normal from the former, the structure which forging uses a difficult hologram as a discernment seal, and is stuck on each above-mentioned object is indicated by JP,61-182580,U. Since such a discernment seal is identified by viewing, it is stuck on the location which is easy to check by looking from the outside of an object. Therefore, since the location of a discernment seal, a configuration, color, etc. needed to be taken into consideration when designing the appearance of an object, not only the degree of freedom of a design falls, but depending on the case, it could not maintain design balance of an appearance, but there was a problem which spoils a fine sight remarkably.

[0003] On the other hand, the hologram section as a discernment seal which has the diffraction property of a proper on the surface of an object is prepared in JP,3-71383,A by the applicant for this patent, and the structure of identifying this hologram section with the identification unit as an optical discernment means is indicated. On the Japanese-Patent-Application-No. No. 259636 [three to] specifications by the same applicant using this structure Although it is usually transparent by preparing the discernment section which reflects the light of this specific wavelength with the diffraction property of a proper using the ingredient which reflects only the light of specific wavelength other than the light (for example, an infrared region) in the object of the above-mentioned information storage card, various negotiable securities, a ticket, etc. The discernment structure where the discernment section is optically discriminable by making light of specific wavelength into detection light is indicated. According to this structure, the design of an object is not restrained, while epicritic [over an object] is high and it is difficult to forge.

[0004] However, it is difficult to obtain the layer which reflects only all the light of specific wavelength in fact, and it possible that the light which should be reflected penetrates to some extent and reflects on the surface of an object. The reflected light results that a reflection factor is high like a metal in especially the front face of an object in the light sensing portion of an identification unit with the reflected light of the discernment section, incorrect detection is caused, and in spite of being the object of normal, it is also considered that the discernment cannot be performed.

[0005]

[Problem(s) to be Solved by the Invention] In view of the trouble of such a conventional technique, the main purposes of this invention are to offer the discernment structure of an object where the design of an object is not restrained while being able to identify an object certainly.

[0006]

[Means for Solving the Problem] According to this invention, such a purpose prepares the discernment

section which has optical epicritic [of a proper] in an object. Irradiate detection light with a floodlighting means towards said discernment section, and the outgoing radiation light is received with a light-receiving means. It is the discernment structure of an object of discriminating said object being an object of normal from the light-receiving condition of said light-receiving means. Said floodlighting means consists of a means to floodlight the linearly polarized wave light which is specific wavelength and has plane of polarization in the specific direction. The light reflex layer in which said discernment section reflects the light of said wavelength with the diffraction property of an identifiable proper with an optical discernment means while consisting of an ingredient which penetrates the light and reflects that of specific wavelength other than the light. It has the plane-of-polarization rotation layer which consists of an optically anisotropic body made to rotate 90 degrees of linearly polarized wave light of said specific wavelength by the birefringence. Said light-receiving means is attained by offering the discernment structure of the object characterized by having the filter which penetrates only said linearly polarized wave light which is not rotating to the light-receiving side.

[0007]

[Function] According to the above-mentioned configuration, since the light is not reflected by the light reflex layer, namely, it becomes transparent, even if there is this discernment section, the design of an object is not influenced at all. Moreover, since the plane of polarization is rotating, the light which penetrated the light reflex layer can perform discernment processing only with the light which could not pass a polarizing filter but was reflected in the light reflex layer.

[0008]

[Example] Hereafter, the drawing of attachment of the suitable example of this invention is explained in detail.

[0009] Drawing 1 - drawing 6 are the examples by which this invention was applied to the magnetic card as an information storage card. As shown in drawing 1, in surface 1a of a card 1, the magnetic stripe 2 has extended at the longitudinal direction of this card. Moreover, the discernment seal 3 as the light reflex section which has the diffraction property of the proper which carries out a postscript is also formed in surface 1a.

[0010] On the other hand, conveyance of a card 1 of the conveyance unit which is not illustrated forms the magnetic head 4 in the interior of the reader writer of a card 1 so that it may counter with the above-mentioned magnetic stripe 2. Moreover, conveyance of a card 1 forms the light emitting/receiving unit 5 so that it may counter with the above-mentioned discernment seal 3. This light emitting/receiving unit 5 consists of a light emitting device 6 for irradiating the illumination light which consists of linearly polarized wave light of a specific direction with a wavelength of 780nm towards the discernment seal 3 on surface 1a of a card 1, and an annular photo detector 8 which surrounds this light emitting device 6 (drawing 3). Moreover, the front face of a photo detector 8 is covered with the polarizing filter 7 which penetrates only the linearly polarized wave light of the above-mentioned specific direction (drawing 2). When a card 1 is in a position, the right pair of the light emitting device 6 can be carried out to the discernment seal 3. A photo detector 8 becomes eight parts 8a-8h which can receive light separately from the hyperfractionation photodiode divided in the direction of a path respectively. This photo detector 8 consists of a well-known CPU, memory, I/F, etc., and is connected to the judgment unit 9 for judging whether a card 1 is a card of normal.

[0011] The discernment seal 3 has the hologram layer 10 which consists of hologram formative layer 10a and its lower layer light reflex layer 10b, the adhesives layer 11 which serves both as that lower layer cushion, and the plane-of-polarization rotation layer 12 of the shape of a film established between this adhesives layer 11 and surface 1a of a card 1 so that it may be well shown in drawing 4. Moreover, the front face of the hologram layer 10 is covered with the protective layer 13.

[0012] Here, hologram formative layer 10a is a layer which penetrates light. Moreover, the permeability is [the light irradiated as the laminating of the comparatively small hexafluoro sodium-aluminate (Na_3AlF_6) layer / of a refractive index / and zinc sulfide (ZnS) layer comparatively big / of a refractive index / is carried out by turns, and it becomes as light reflex layer 10b is shown in Table 1, and shown in drawing 5 R> 5] high (100% of abbreviation) in the light (wavelength of 380nm - 700nm) region, and it

is low in the infrared light region (wavelength 700nm-) region. Therefore, this hologram layer 10 has the diffraction property reflected towards any two antimeres whose light emitting devices 6 diffract the infrared light from the direction which carries out a right pair to the discernment structure 2 while being able to check almost by looking no longer, and reflect and are pinched among each parts 8a-8h by human being's eyes.

[0013] On the other hand, the plane-of-polarization rotation layer 12 is formed by carrying out extension processing of the polycarbonate with a comparatively big birefringence. Moreover, the thickness of this plane-of-polarization rotation layer 12 is set that that amount of birefringences is set to one fourth of the wavelength of the laser beam irradiated from the above-mentioned light emitting device 6. Therefore, that plane of polarization rotates 90 degrees of light which penetrated light reflex layer 10b among the laser beams which carried out incidence to the discernment seal 3 by passing this plane-of-polarization rotation layer 12, reflecting in surface 1a of a card 1, and passing the plane-of-polarization rotation layer 12 again.

[0014] In order to actually identify a card 1, a card 1 is conveyed and the right pair of the discernment seal 3 is carried out to the light emitting device 6 of a light emitting/receiving unit 5. Then, the illumination light with a wavelength of 780nm which consists of linearly polarized wave light of the above-mentioned specific direction towards the discernment seal 3 is irradiated from a light emitting device 6. And it diffracts with the discernment seal 3, and a polarizing filter 7 is penetrated, light is received by each parts [of a photo detector 8 / 8a-8h] either, and the reflected light identifies that a card 1 is a card of normal with the light-receiving reinforcement. Although 90 degrees of that plane of polarization rotate and it results in the above-mentioned polarizing filter 7 by the light which penetrated light reflex layer 10b going and coming back to the plane-of-polarization rotation layer 12, and passing at this time, this is not penetrated and it does not result in a photo detector 8. Thereby, even if the reflection factor of the light of surface 1a of a card 1 is high, it does not incorrect-detect (drawing 6).

[0015] For example, even if it receives in order to forge this card 1, since it is hard to check the discernment seal 3 by looking with the naked eye, it is hard to pinpoint that location, and the reflective directive property of hologram ***** is analyzed, it is very difficult technically to forge and forgery of it becomes impossible from creation of the still more nearly same hologram taking great cost substantially.

[0016] In addition, this invention was not limited to the above-mentioned example, and it did not need to say that various application was possible, for example, the illumination light was diffracted towards any two each parts [of a photo detector 8 / 8a-8h] places in the above-mentioned example, the hologram was formed so that it might reflect, but the illumination light may be diffracted more than towards each parts [8a-8h] any four places or it, and a hologram may be formed so that it may reflect.

[0017] Moreover, although discernment structure was prepared in the magnetic card 1 as an information storage card in the above-mentioned example, the same effectiveness is acquired even if it prepares in a check, a note, various negotiable securities like a gift certificate, the goods that generally circulate, or its package. If the above-mentioned opening shows the pasting location of the discernment seal 3 by covering a card 1 with the mask with which opening was prepared in the position in this case, discernment of the discernment seal 3 can also be performed with the hand scanner of portability etc.

[0018] Furthermore, although the hologram was used for the discernment seal 3 stuck on a card 1 in the above-mentioned example, the same effectiveness is acquired even if it uses a diffraction grating.

[0019]

[Effect of the Invention] A floodlighting means to floodlight the linearly polarized wave light which has plane of polarization in the specific direction according to the discernment structure of the object by this invention as mentioned above, The light reflex layer which penetrates the light and reflects the light of specific wavelength other than the light with the reflective directive property of a proper, The discernment section prepared in the object which has the plane-of-polarization rotation layer which consists of an optically anisotropic body made to rotate 90 degrees of linearly polarized wave light of the above-mentioned specific wavelength which penetrated this light reflex layer by the birefringence, By having the polarizing filter prepared in the light-receiving side of a light-receiving means to receive

the reflected light from the above-mentioned light reflex layer, and a light-receiving means to penetrate only the above-mentioned linearly polarized wave light which is not rotating. Since the light is not reflected by the light reflex layer, namely, it becomes transparent, this discernment structure does not affect the design of an object at all, and the degree of freedom on a design improves remarkably. Moreover, since the reflected light from the object front face which serves as a noise at the time of discernment can be intercepted, discernment dependability improves. The effectiveness of the above thing to this invention is size.

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TECHNICAL FIELD

[Industrial Application] This invention relates to the discernment structure for identifying that an object is an object of normal.

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PRIOR ART

[Description of the Prior Art] In order to discriminate whether an information storage card, various negotiable securities, a ticket, or the goods that are generally sold, such as a magnetic card, etc. are the things of normal from the former, the structure which forging uses a difficult hologram as a discernment seal, and is stuck on each above-mentioned object is indicated by JP,61-182580,U. Since such a discernment seal is identified by viewing, it is stuck on the location which is easy to check by looking from the outside of an object. Therefore, since the location of a discernment seal, a configuration, color, etc. needed to be taken into consideration when designing the appearance of an object, not only the degree of freedom of a design falls, but depending on the case, it could not maintain design balance of an appearance, but there was a problem which spoils a fine sight remarkably.

[0003] On the other hand, the hologram section as a discernment seal which has the diffraction property of a proper on the surface of an object is prepared in JP,3-71383,A by the applicant for this patent, and the structure of identifying this hologram section with the identification unit as an optical discernment means is indicated. On the Japanese-Patent-Application-No. No. 259636 [three to] specifications by the same applicant using this structure Although it is usually transparent by preparing the discernment section which reflects the light of this specific wavelength with the diffraction property of a proper using the ingredient which reflects only the light of specific wavelength other than the light (for example, an infrared region) in the object of the above-mentioned information storage card, various negotiable securities, a ticket, etc. The discernment structure where the discernment section is optically discriminable by making light of specific wavelength into detection light is indicated. According to this structure, the design of an object is not restrained, while epicritic [over an object] is high and it is difficult to forge.

[0004] However, it is difficult to obtain the layer which reflects only all the light of specific wavelength in fact, and it possible that the light which should be reflected penetrates to some extent and reflects on the surface of an object. The reflected light results that a reflection factor is high like a metal in especially the front face of an object in the light sensing portion of an identification unit with the reflected light of the discernment section, incorrect detection is caused, and in spite of being the object of normal, it is also considered that the discernment cannot be performed.

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EFFECT OF THE INVENTION

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TECHNICAL PROBLEM

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MEANS

[Means for Solving the Problem] According to this invention, such a purpose prepares the discernment section which has optical epicritic [of a proper] in an object. Irradiate detection light with a floodlighting means towards said discernment section, and the outgoing radiation light is received with a light-receiving means. It is the discernment structure of an object of discriminating said object being an object of normal from the light-receiving condition of said light-receiving means. Said floodlighting means consists of a means to floodlight the linearly polarized wave light which is specific wavelength and has plane of polarization in the specific direction. The light reflex layer in which said discernment section reflects the light of said wavelength with the diffraction property of an identifiable proper with an optical discernment means while consisting of an ingredient which penetrates the light and reflects that of specific wavelength other than the light, It has the plane-of-polarization rotation layer which consists of an optically anisotropic body made to rotate 90 degrees of linearly polarized wave light of said specific wavelength by the birefringence. Said light-receiving means is attained by offering the discernment structure of the object characterized by having the filter which penetrates only said linearly polarized wave light which is not rotating to the light-receiving side.

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OPERATION

[Function] According to the above-mentioned configuration, since the light is not reflected by the light reflex layer, namely, it becomes transparent, even if there is this discernment section, the design of an object is not influenced at all. Moreover, since the plane of polarization is rotating, the light which penetrated the light reflex layer can perform discernment processing only with the light which could not pass a polarizing filter but was reflected in the light reflex layer.

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EXAMPLE

[Example] Hereafter, the drawing of attachment of the suitable example of this invention is explained in detail.

[0009] Drawing 1 - drawing 6 are the examples by which this invention was applied to the magnetic card as an information storage card. As shown in drawing 1, in surface 1a of a card 1, the magnetic stripe 2 has extended at the longitudinal direction of this card. Moreover, the discernment seal 3 as the light reflex section which has the diffraction property of the proper which carries out a postscript is also formed in surface 1a.

[0010] On the other hand, conveyance of a card 1 of the conveyance unit which is not illustrated forms the magnetic head 4 in the interior of the reader writer of a card 1 so that it may counter with the above-mentioned magnetic stripe 2. Moreover, conveyance of a card 1 forms the light emitting/receiving unit 5 so that it may counter with the above-mentioned discernment seal 3. This light emitting/receiving unit 5 consists of a light emitting device 6 for irradiating the illumination light which consists of linearly polarized wave light of a specific direction with a wavelength of 780nm towards the discernment seal 3 on surface 1a of a card 1, and an annular photo detector 8 which surrounds this light emitting device 6 (drawing 3). Moreover, the front face of a photo detector 8 is covered with the polarizing filter 7 which penetrates only the linearly polarized wave light of the above-mentioned specific direction (drawing 2). When a card 1 is in a position, the right pair of the light emitting device 6 can be carried out to the discernment seal 3. A photo detector 8 becomes eight parts 8a-8h which can receive light separately from the hyperfractionation photodiode divided in the direction of a path respectively. This photo detector 8 consists of a well-known CPU, memory, I/F, etc., and is connected to the judgment unit 9 for judging whether a card 1 is a card of normal.

[0011] The discernment seal 3 has the hologram layer 10 which consists of hologram formative layer 10a and its lower layer light reflex layer 10b, the adhesives layer 11 which serves both as that lower layer cushion, and the plane-of-polarization rotation layer 12 of the shape of a film established between this adhesives layer 11 and surface 1a of a card 1 so that it may be well shown in drawing 4. Moreover, the front face of the hologram layer 10 is covered with the protective layer 13.

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[0013] On the other hand, the plane-of-polarization rotation layer 12 is formed by carrying out extension processing of the polycarbonate with a comparatively big birefringence. Moreover, the thickness of this

plane-of-polarization rotation layer 12 is set that that amount of birefringences is set to one fourth of the wavelength of the laser beam irradiated from the above-mentioned light emitting device 6. Therefore, that plane of polarization rotates 90 degrees of light which penetrated light reflex layer 10b among the laser beams which carried out incidence to the discernment seal 3 by passing this plane-of-polarization rotation layer 12, reflecting in surface 1a of a card 1, and passing the plane-of-polarization rotation layer 12 again.

[0014] In order to actually identify a card 1, a card 1 is conveyed and the right pair of the discernment seal 3 is carried out to the light emitting device 6 of a light emitting/receiving unit 5. Then, the illumination light with a wavelength of 780nm which consists of linearly polarized wave light of the above-mentioned specific direction towards the discernment seal 3 is irradiated from a light emitting device 6. And it diffracts with the discernment seal 3, and a polarizing filter 7 is penetrated, light is received by each parts [of a photo detector 8 / 8a-8h] either, and the reflected light identifies that a card 1 is a card of normal with the light-receiving reinforcement. Although 90 degrees of that plane of polarization rotate and it results in the above-mentioned polarizing filter 7 by the light which penetrated light reflex layer 10b going and coming back to the plane-of-polarization rotation layer 12, and passing at this time, this is not penetrated and it does not result in a photo detector 8. Thereby, even if the reflection factor of the light of surface 1a of a card 1 is high, it does not incorrect-detect (drawing 6).

[0015] For example, even if it receives in order to forge this card 1, since it is hard to check the discernment seal 3 by looking with the naked eye, it is hard to pinpoint that location, and the reflective directive property of hologram ***** is analyzed, it is very difficult technically to forge and forgery of it becomes impossible from creation of the still more nearly same hologram taking great cost substantially.

[0016] In addition, this invention was not limited to the above-mentioned example, and it did not need to say that various application was possible, for example, the illumination light was diffracted towards any two each parts [of a photo detector 8 / 8a-8h] places in the above-mentioned example, the hologram was formed so that it might reflect, but the illumination light may be diffracted more than towards each parts [8a-8h] any four places or it, and a hologram may be formed so that it may reflect.

[0017] Moreover, although discernment structure was prepared in the magnetic card 1 as an information storage card in the above-mentioned example, the same effectiveness is acquired even if it prepares in a check, a note, various negotiable securities like a gift certificate, the goods that generally circulate, or its package. If the above-mentioned opening shows the pasting location of the discernment seal 3 by covering a card 1 with the mask with which opening was prepared in the position in this case, discernment of the discernment seal 3 can also be performed with the hand scanner of portability etc.

[0018] Furthermore, although the hologram was used for the discernment seal 3 stuck on a card 1 in the above-mentioned example, the same effectiveness is acquired even if it uses a diffraction grating.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the important section configuration perspective view of the discernment structure for identifying that a card and this card are cards of normal.

[Drawing 2] It is the sectional side elevation of a light emitting device and a photo detector.

[Drawing 3] It is the top view of a light emitting device and a photo detector.

[Drawing 4] It is the expanded sectional view of the discernment section.

[Drawing 5] It is the graph which shows the relation between the wavelength of the exposure light of a light reflex layer, and permeability.

[Drawing 6] It is the sectional side elevation showing the actuation point of this example.

[Description of Notations]

1 Card

1a Front face

2 Magnetic Stripe

3 Discernment Seal

4 Magnetic Head

5 Light Emitting/receiving Unit

6 Light Emitting Device

7 Polarization Film

8 Photo Detector

8a-8h Part

9 Judgment Unit

10 Hologram Layer

10a Hologram formative layer

10b Light reflex layer

11 Adhesives Layer

12 Plane-of-Polarization Rotation Layer

13 Protective Layer

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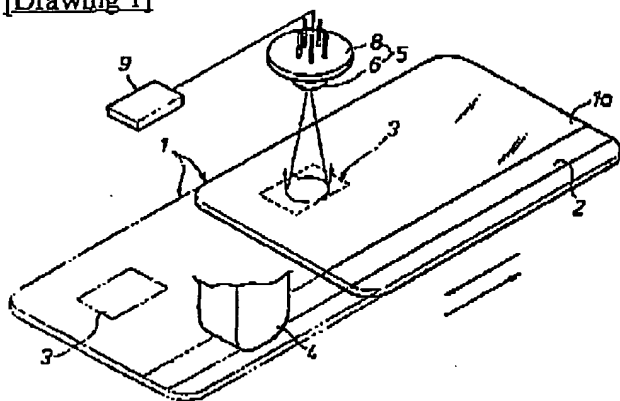
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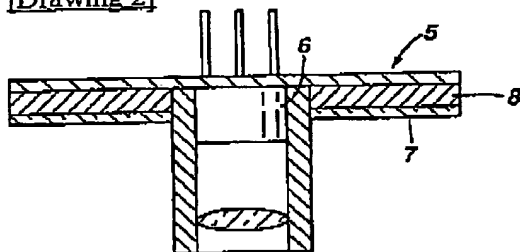
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DRAWINGS

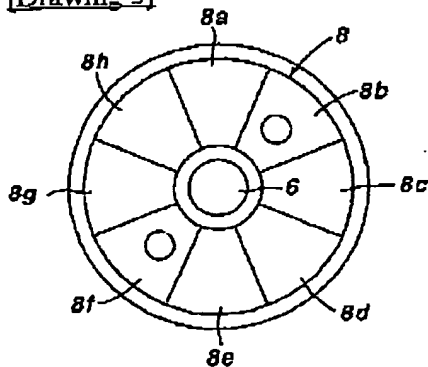
[Drawing 1]



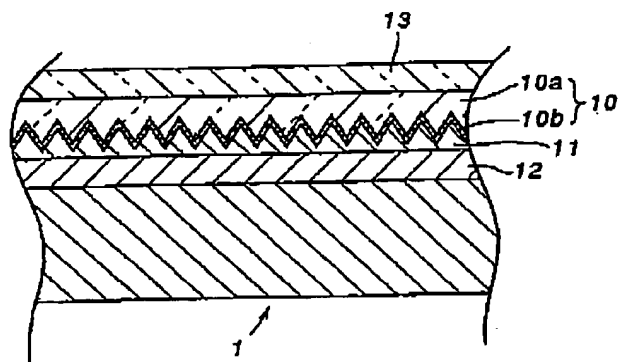
[Drawing 2]



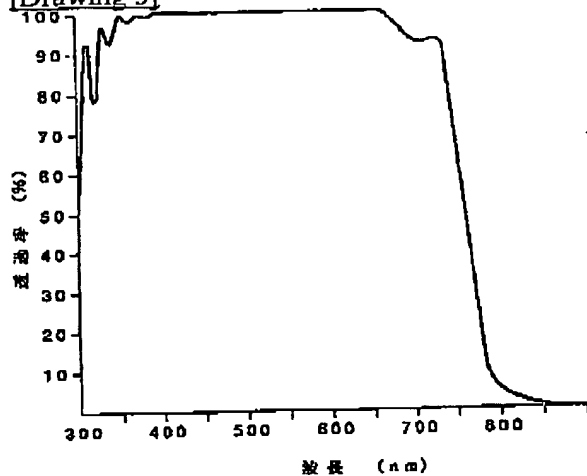
[Drawing 3]



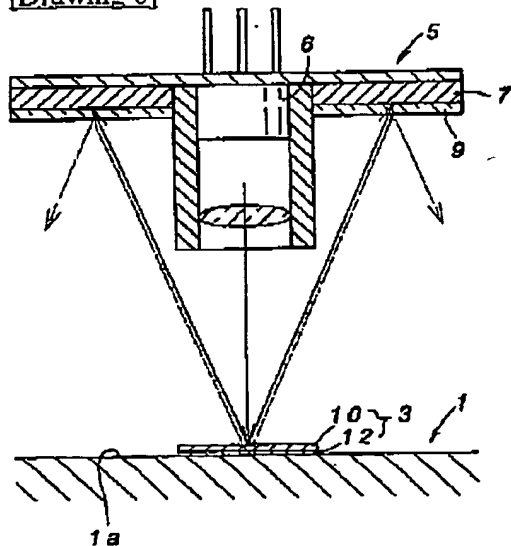
[Drawing 4]



[Drawing 5]



[Drawing 6]



[Translation done.]